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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,395	04/15/2004	Nongji Chen	1906-0133PUS1	6416

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EXAMINER	
DSOUZA, JOSEPH FRANCIS A	
ART UNIT	PAPER NUMBER
2611	

NOTIFICATION DATE	DELIVERY MODE
07/10/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/824,395	CHEN ET AL.	
	Examiner	Art Unit	
	ADOLF DSOUZA	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 5, 8 - 11* is/are rejected.

7)☒ Claim(s) *6 - 7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Arguments

1. Applicant's arguments filed 4/14/2008 have been fully considered but they are not persuasive.

- Argument: Applicant argued that "McCorkle teaches a very different system from Peyla and Huang and one of ordinary skill ... in view of McCorkle's teachings" (Remarks 4/14/2008, page 3, 2nd last paragraph - page 4, 1st paragraph).

  Response: Examiner respectfully disagrees. Peyla teaches obtaining the synchronization pulse using amplitude differences. Huang teaches obtaining the synchronization pulse using phase differences. McCorkle teaches obtaining the synchronization using parallel correlators, whereby each correlator obtains the synchronization pulse. One of ordinary skill in the art can easily incorporate Peyla's method and Huang's method into different correlator paths in McCorkle's systems since McCorkle clearly states that doing this has several advantages (column 10, lines 24 – 39).

- Argument: Applicant argued that there is no teaching or suggestion of the first and second signal being combined to give a resultant signal (Remarks 4/14/2008, page 4, middle of middle paragraph).

  Response: Examiner respectfully disagrees. McCorkle discloses the use of coherent addition of the signals (column 10, lines 24 – 39). One of ordinary skill in the art can easily use the same concept for the first and second signals. Combining them in a

weighted manner would result in the Applicant's invention. It seems inconceivable that one of ordinary skill in the art would have two synchronization detection schemes in parallel and then use only one, when combining would obviously result in a more robust method. For example, if the two schemes were equally good, one would combine them to obtain a stronger synchronization pulse. If one was poor and the other good, the poorer one would have a much smaller weighting.

- Argument: Applicant argued that McCorkle doesn't have any guard spaces.

  Response: Examiner contends that this argument is not really relevant. Applicant's invention is geared towards improving the synchronization detection in an OFDM system. McCorkle, even though he may not discuss OFDM, is also related to improving the synchronization detection. Further, McCorkle discloses that other modulation schemes could be used in his system (column 9, lines 4 – 12).

For the above reasons, Examiner is maintaining his rejection as in the last Office Action.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1 – 5, 8 - 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peyla et al. (US 6,539,063) in view of Huang et al. (EP 0896457 A1, Symbol Synchronization for MCM signals with guard interval; which has been provided by the Applicant in his IDS) and further in view of McCorkle et al. (US 6,505,032).

Regarding claim 1, Peyla discloses a method of generating a synchronization pulse representing a symbol boundary (column 2, lines 23 – 42; column 6, line 51 – column 7, line 16) in a signal, data in each guard space corresponding to part of the data in a respective useful period (column2, lines 27 – 30; wherein applicant has admitted this in his Remarks [9/11/2007, page 9, 1st 3 lines]) the method comprising processing pairs of samples of a received signal which are separated by a period corresponding to the useful part of the symbol (Fig. 3, complex samples 60 input to the circuit; column 6, line 52 – column 7, line 16) by deriving a first signal dependent upon the relationship between the amplitudes of the samples of each pair (Fig. 3, element 195 output; column 11, lines 38 – 51; wherein the first signal is the output of element 195).

Peyla does not disclose a second signal dependent on the phases of each pair that is used for detecting the synchronization pulse and combining the first and second signals to obtain the synchronization pulse.

In the same field of endeavor, however, Huang a second signal dependent upon the relationship between the phases of the samples of each pair (Fig. 4; Abstract (57) on

page1; paragraphs 32 – 33, 38; wherein the circuitry in Fig. 4 is used to obtain the synchronization pulse using the phase).

In the same field of endeavor, however, McCorkle discloses combining the first and second signals and generating the synchronization pulse in response to the resultant signal changing in a predetermined manner (Fig. 2, elements 31-1 – 31-N; column 9, lines 39 - 44; column 10, lines 24 – 39; wherein the plurality of correlators is interpreted as including the amplitude correlator and the phase correlator).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made to have one of the correlators as the amplitude correlator disclosed by Peyla (first signal) and another of the correlators as the phase correlator disclosed by Huang (second signal) since this would increase the reliability of the detection process, as disclosed by McCorkle.

Regarding claim 2, Peyla discloses the synchronization pulse is generated in response to detecting a change in the resulting signal corresponding to termination of processing of the guard space data of the first of multiple versions of the signal subject to respective different delays (Abstract; column 2, lines 16 – 42; wherein the synchronization detection is the symbol boundary detection and the multiple versions of the signal subject to different delays are the leading and trailing portions).

Regarding claim 3, Peyla discloses the step of low-pass filtering the first signal so as to reduce variations in the value of the first signal for successive sample pairs (Fig. 3, element 145; column 10, lines 56 - 63).

Regarding claim 4, Peyla does not disclose low pass filtering the phase signal.

In the same field of endeavor, however, Huang discloses the step of low-pass filtering the second signal so as to reduce variations in the value of the second signal for successive sample pairs (Fig. 3, element 17; page 4, paragraph 25; Fig. 4, element 166; wherein the phase value are filtered by the averaging filter 17 and 166).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Huang, in the system of Peyla because this would smoothen out the phase signal, as is well known in the art.

Regarding claim 5, Peyla does not disclose detecting high levels of phase difference.

In the same field of endeavor, however, Huang discloses the step of filtering the second signal by tracking values corresponding to relatively high levels of phase difference (Fig. 3, element 16; page 5, paragraphs 29 – 31).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Huang, in the system of Peyla because this would allow for detection of abrupt phase changes, as disclosed by Huang.

Regarding claim 8, Peyla discloses the first, second and resultant signals are derived in such a way that the resultant signal can fluctuate at intervals which are substantially shorter than the guard space (Fig. 7a – 7d; wherein the signal fluctuations are as shown in Figs. 7c and 7d).

Regarding claim 9, Peyla discloses a synchronization pulse representing a symbol boundary in an OFDM signal (Abstract; column 2, lines 23 – 42).

Claim 10 is directed to apparatus of the same subject matter claimed in method/steps claim 9 and therefore, is rejected as explained in the rejection of claim 9 above.

Regarding claim 11, Peyla discloses a receiver comprising means for receiving (Fig. 2, element 45) and demodulating a signal (Fig. 2, element 100), the receiver comprising apparatus as claimed in claim 10

Allowable Subject Matter

4. Claims 6 - 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Other Prior Art Cited

5. The prior art made of record and not relied upon is considered pertinent to the applicant's disclosure.

The following patents are cited to further show the state of the art with respect to synchronization in OFDM systems:

Huang et al. (US 5,991,289) discloses a synchronization method and apparatus for guard interval-based OFDM signals.

Harikumar et al. (US 20020106035) discloses a spectrally constrained impulse-shortening filter for a discrete multi-tone receiver.

Seki (US 5,602,835) discloses an OFDM synchronization demodulation circuit.

Isaksson et al. (US 5,652,772) discloses a Method and apparatus for synchronization in digital transmisison systems of the OFDM type.

Schmidl et al. (US 5,732,113) discloses timing and frequency synchronization of OFDM signals.

Davies et al. (US 5,953,311) discloses timing synchronization in a receiver employing orthogonal frequency division multiplexing.

Yonge (US 6,074,086) discloses synchronization of OFDM signals with improved windowing.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADOLF DSOUZA whose telephone number is (571)272-1043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Adolf DSouza

Examiner
Art Unit 2611

AD

/David C. Payne/
Supervisory Patent Examiner, Art Unit 2611